Installation and Operating Instructions

WATERFRIEND exclusiv **MRD-2**

Water treatment for pH and ORP
optional with web server and Internet connection

Technical Data	**WATER**FRIEND *exclusiv*

Nominal voltage	1/N/PE 230V/50Hz
Metering pump pH	Peristaltic pump
Metering pump ORP	Peristaltic pump
Flow rate pH	0 to 10 L / h
Flow rate ORP	0 to 10 L / h
Protection class	IP 20
Housing size	500 x 390 x 130
Humidity	0 to 95%, non condensing
Surrounding temperature	0 to 40 °C
Measuring water pressure	max. 2 bar

CE

Made by osf

Subject

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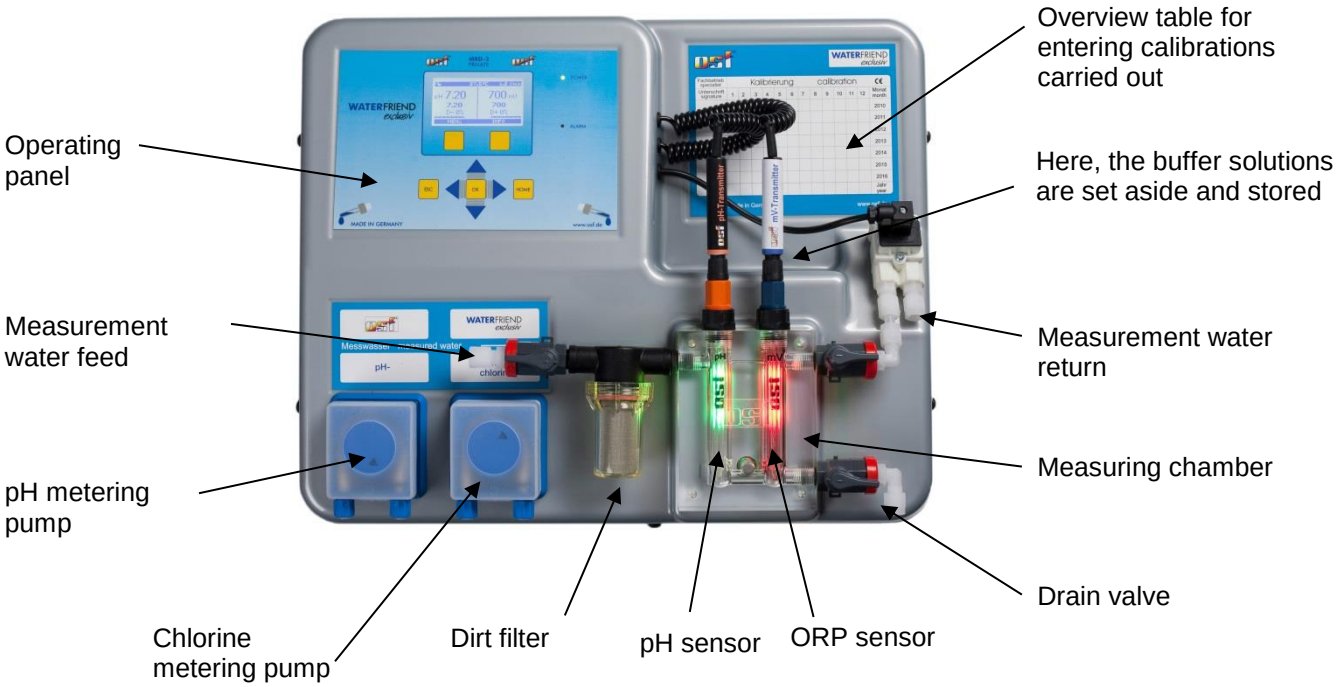
General



Safety information

Installation and operating manual

This operating manual contains important information which must be observed during installation, operation and maintenance of the metering unit. For this reason, it is imperative that this operating manual is read by the fitter and the responsible specialist personnel or equipment owner before installation and initial start-up. It must be continuously available at the device installation location.

Caution

The metering liquids used are corrosive or highly flammable. The two pressure hose ends at the hose pumps must never be hanging freely, otherwise corrosive or highly flammable liquids can be discharged.

Canister

The canisters containing the metering liquids must be placed in osi interception troughs. They may never be placed directly underneath the controller. Gas-emitting chemicals can cause damage to the sensitive controller.

Personnel qualification

The personnel who will be operating, maintaining, inspecting and installing the device must have appropriate qualifications for this work. The plant operator must precisely define the areas of responsibility, responsibilities and monitoring of the personnel. If the personal does not have the required knowledge, they must be trained and instructed. This can be carried out by the manufacturer or supplier on behalf of the owner if required. Furthermore, the owner must ensure that the contents of this operating manual have been understood by his personnel in all respects.

Installation

You have purchased a high-quality measuring, regulating and metering device with the WATERFRIEND. The device is a precise and sensitive system which needs to be handled carefully at all times. Please handle the protective cover carefully as well. It may not be allowed to fall down or come into contact with chemicals. The protective cover should be cleaned using a soft cloth and a little water if necessary.

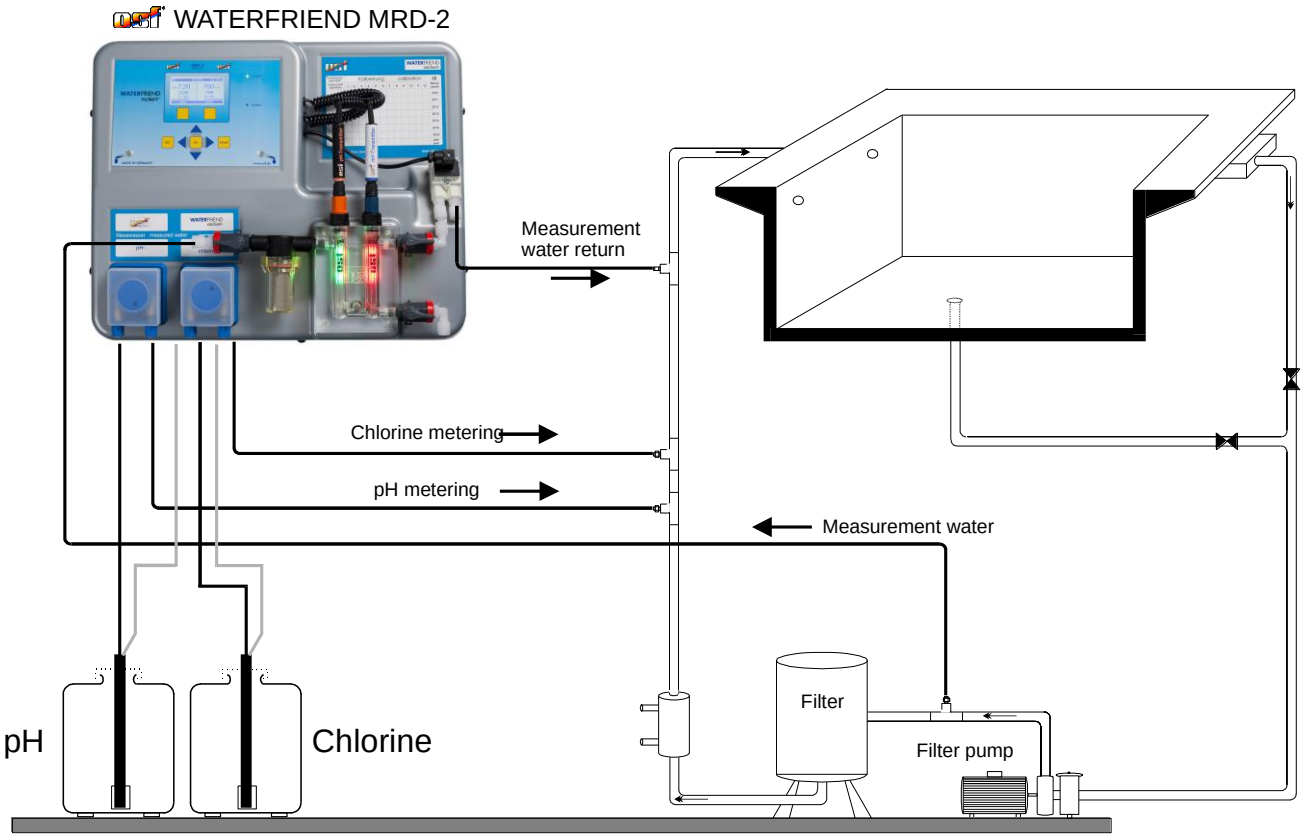
All regulations and provisions applicable to the place of installation must be observed during installation. The swimming pool must be constructed such that a possible technical malfunction, power failure or a defective metering system may not cause any consequential loss.

Installation

The bottom housing section is fixed vertically and permanently to a solid wall with suitable load-bearing capacity. Please ensure that the measuring cells are vertical after this has been carried out. The installation location must be protected against dust and water in order to guarantee correct and proper functioning of the device. The surrounding temperature must be between -0° C und + 40° C and should be kept as constant as possible. Humidity at the installation site may not exceed 95%, and no condensation may take place. Please avoid direct heat or sun irradiation onto the device.

Installation in the water circuit

Please observe all valid safety regulations when carrying out installation work, and ensure that this is carried out carefully. Disconnect the measuring, regulation and metering device and all other electrical consumers such as filter pumps and heaters from the power supply.



General informational installation in the water circuit

- Before carrying out initial start-up, ensure that the injection valves open and close reliably.
- All hoses must be routed free of kinks.
- Avoid routing hoses over sharp edges.
- Connect all hoses carefully and check to ensure that they are tightly fitted to their connections.
- Avoid unnecessarily long hose lengths.
- Hoses may not be routed directly over pipes carrying heat or over other devices.

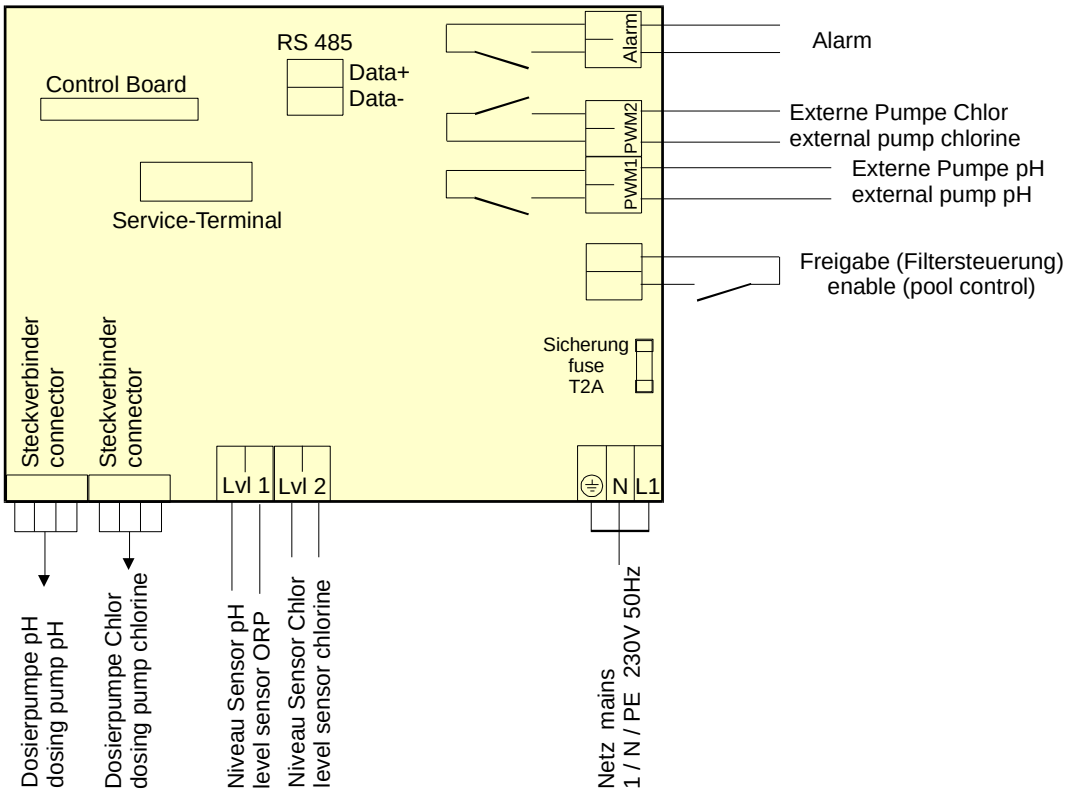
Electrical power supply

The controller must be mounted protected against moisture in accordance with its protection class. The device must be powered via a multi-pole main switch with a contact opening width of at least 3mm and a residual current circuit breaker with $I_{FN} \leq$ 30mA. **The device must be isolated before opening the housing. Electrical power supply connections, in addition to alignment and service work, may only be carried out by approved electricians. The attached circuit diagrams and all applicable safety regulations must be observed.**

Low-voltage cables

Low-voltage cables may not be routed together with three-phase or alternating current cables in one cable duct. Routing of low-voltage cables in the vicinity of three-phase or alternating current cables should generally be avoided.

Wiring diagram



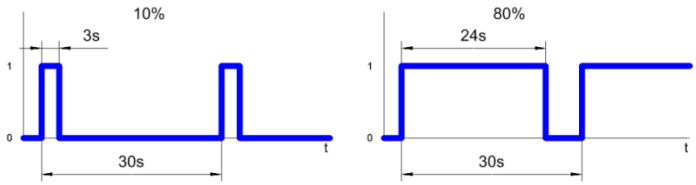
Alarm

An external acoustic or optical alarm can be connected to these terminals. These terminals can also be used for connection to group error messaging systems. The terminals can be loaded with maximum 230V 1A.

External pumps

These connecting terminals are control contacts for external metering pumps. The terminals can be loaded with maximum 230V 1A.

These outputs deliver clock signals with pulse duty factors that are proportional to the current dosing rate of the built-in dosing pumps and thus enable the stepless control of external pumps.



For safety reasons, the two outputs are interlocked, i.e. when the pH metering pump is working, the chlorine metering pump is always switched off.

Enabling

These connecting terminals are used for interlocking with a filter control unit. Opening the floating contact within the filter control unit causes interruption of the metering process.

RS-485

These terminals are used for connection to the Euromatik.net filter control unit. A screened, twisted, 2-core cable (twisted pair) with a cross-section of at least 0.22 mm2 is required for the connection. (e.g. Li2YCY(TP) 2 x 0.22 mm²). Screening improves the electromagnetic compatibility (EMC). The cable length of the complete bus-system may not exceed 1200 m. The polarity (DATA+ and DATA) must be observed.

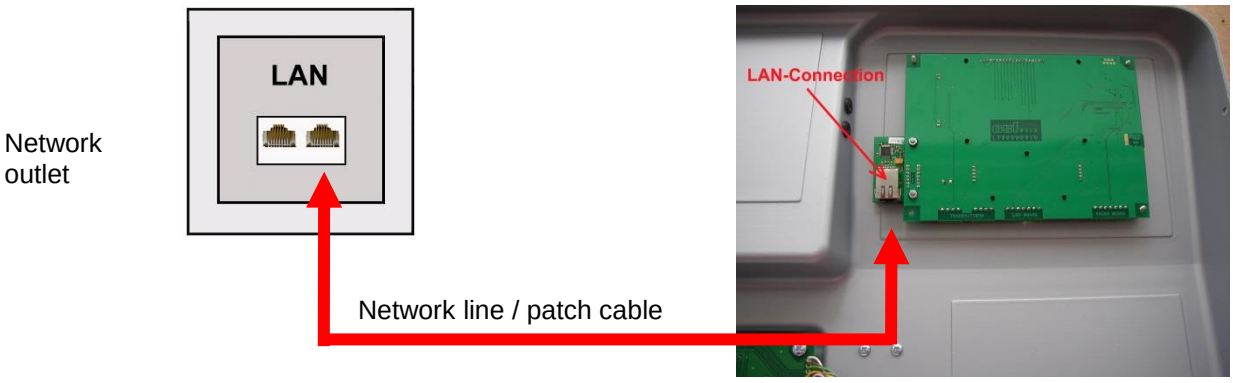
Connecting to EUROMATIK.net

External Touch-Panel

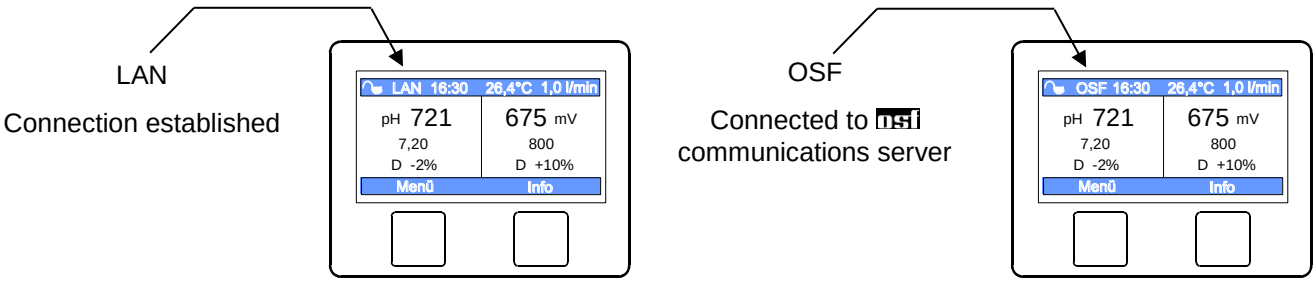
The RS-485 connection terminals are used for data transmission to the EUROMATIK.net. Thus it can be accessed from the external touch panel of EUROMATIK.net to the water treatment WATERFRIEND MRD-2. Please note the instruction manual of the EUROMATIK.net.

Connecting to the computer network (optional)

Connection to the Internet is only possible for dosing controls with integrated web server (option) and is carried out by the communication server. The WATERFRIEND MRD-2 is connected using a standard Ethernet patch cable into the network wall outlet, the powerline adapter, the wireless LAN access point or other suitable facilities.

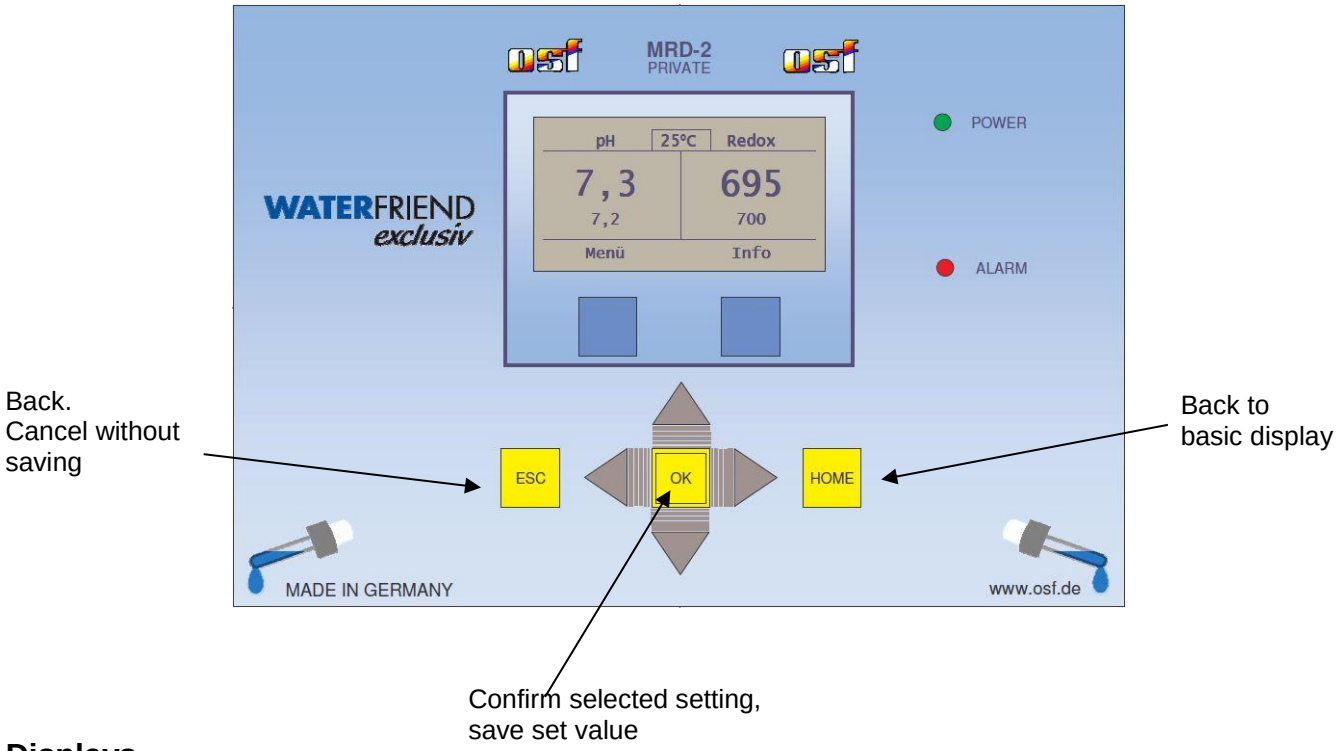


After the WATERFRIEND was connected to an active network outlet, the power supply can be turned on. The web server in WATERFRIEND now searches autonomously for the communication server and logs on to the database.

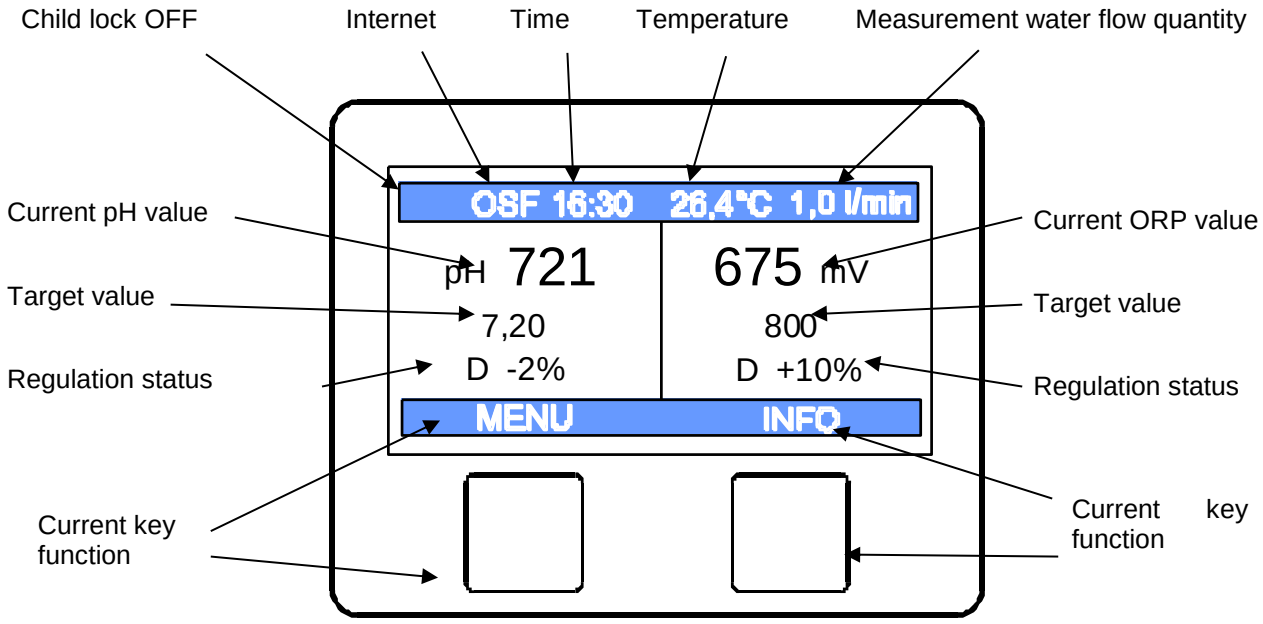


If the "OSF" icon in the monitor is visible (see chart), the WATERFRIEND has logged on to the communication server.

Operation



Displays



Temperature

The displayed temperature is the measurement water temperature within the flow fittings. This can deviate from the actual water temperature in the swimming pool depending on the pipeline routing and surrounding temperatures.

Measurement water flow quantity

Quantity of water flowing through the measuring chamber.

Regulation status

In the "Regulation status" fields, additional information about the respective operating status of the individual controllers is displayed:

Display	Meaning
off	The controller is out of order
D ± xx %	Display of the current dosing rate and the dosing direction
too high	The measured value has exceeded the specified upper alarm limit value.
too low	The measured value has exceeded the specified lower alarm limit value.
flow	The control was temporarily interrupted because the sample water flow rate is outside the permissible limits and therefore no reliable measurement is possible.
ext. lock	The regulation was blocked by the enable signal of the filter control.
delay	The control is not yet active because the switch-on delay for stabilizing the measured values has not yet ended
tank	The chemicals canister is empty.
pH too high	The chlorine dosing is temporarily blocked because the pH value is too high for reliable chlorine control.
pH too low	The chlorine dosing is temporarily blocked because the pH value is too low for reliable chlorine control.
dos. time	Dosing is blocked because the specified maximum dosing time has been exceeded. **After eliminating the cause of the error, this error message must be acknowledged by pressing the start button on the info page**.
meas. err	Dosing is blocked because the sensor is not delivering a valid measured value.
pH problem	The chlorine dosing is blocked because the pH sensor is not delivering a valid measured value.
transmitt.	Dosing is blocked because the measured value transmitter is not working.
error	Dosing is blocked because the control electronics are not working.

Child lock

This symbol shows the child lock status

The child lock is switched off as supplied.

To switch off child lock, press the HOME key for 5 seconds

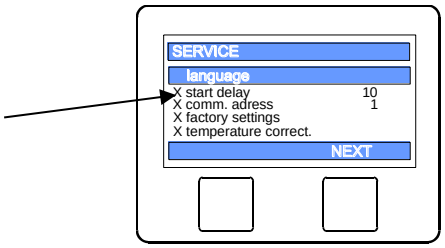
To switch child lock on, press the HOME key for 5 seconds

All keys are blocked if the child lock is switched on! Only the ESC key is active and enables querying of the device type.

Professional level

The WATERFRIEND offers protection against unauthorised changes to important operating parameters.

This safety function is activated as supplied. All the parameters marked with X in the display are blocked.



Safety function OFF

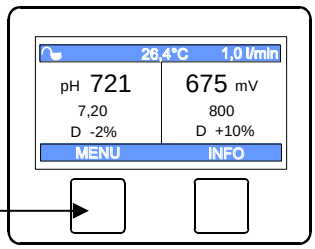
Safety function ON (no symbol)

To switch the safety function off, press the ◁, △ and ▷ keys simultaneously.

The safety function switches itself on again automatically one hour after the last time one of these keys was actuated.

Bleed metering hose

The WATERFRIEND offers the facility for switching the metering pump on manually so that the meeting hoses can be bled.



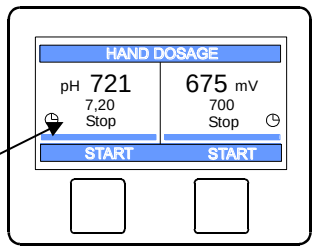
Procedure:

Press the "MENU" key

Move the cursor (blue backed text) to the line "hand dosage" by pressing the keys △ or ▽.

Press the OK key.

Each metering pump can be switched on and off individually by pressing the appropriate keys. While doing so, please observe the corresponding status display. The maximum runtime is limited to 60 seconds. Once this time has elapsed, the pumps will be switched off automatically. The remaining runtime is shown graphically in the display.

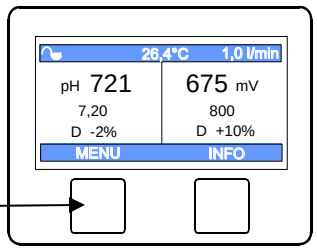


Runtime

pH regulation

Switching off pH regulation

In the menu there is a setting to turn on and off the automatic pH control.



Procedure:

Press the "MENU" key

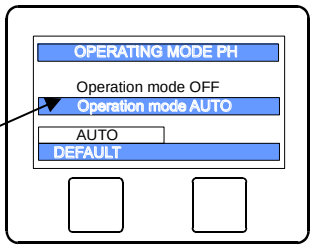
Move the cursor (blue backed text) to the line "set pH" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "operating mode" by pressing the keys △ or ▽.

Press the OK key.

By pressing the arrow keys △ and ▽ the cursor can be moved and the desired operating mode can be selected.



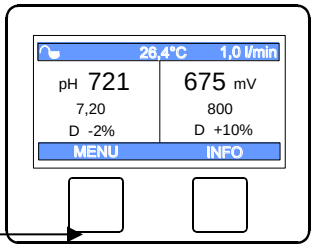
Operating mode:
OFF or AUTO

Press the OK key to save the settings.

Factory setting: AUTO

Setting the pH target value

There is a setting facility for the required pH value in the menu.



Procedure:

Press the "MENU" key

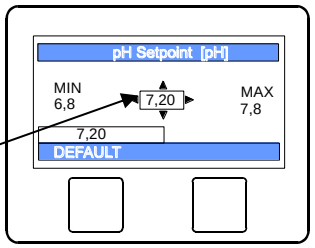
Move the cursor (blue backed text) to the line "set pH" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "setpoint" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the target value. The maximum and minimum possible values are shown right and left in the display.



Setpoint

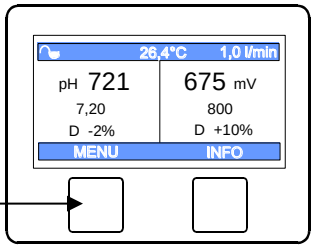
Press the OK key to save the settings.

Setting the alarm limit values

These settings may only be adjusted by a specialist.

Setting the lower pH alarm

There is a setting facility for the required alarm limit value in the menu.



Procedure:

Press the "MENU" key

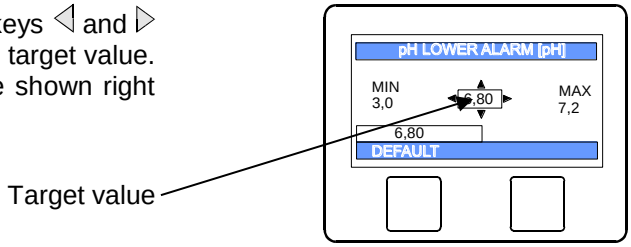
Move the cursor (blue backed text) to the line "set pH" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "lower alarm" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the target value. The maximum and minimum possible values are shown right and left in the display.

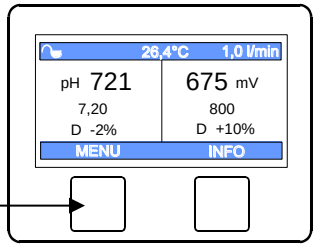


Press the OK key to save the settings.

Factory setting: 6,0

Setting the upper pH alarm

There is a setting facility for the required alarm limit value in the menu.



Procedure:

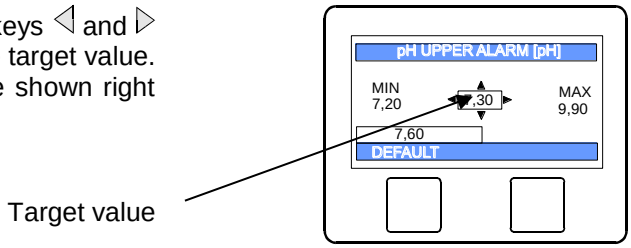
Move the cursor (blue backed text) to the line "set pH" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "upper alarm" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the target value. The maximum and minimum possible values are shown right and left in the display.

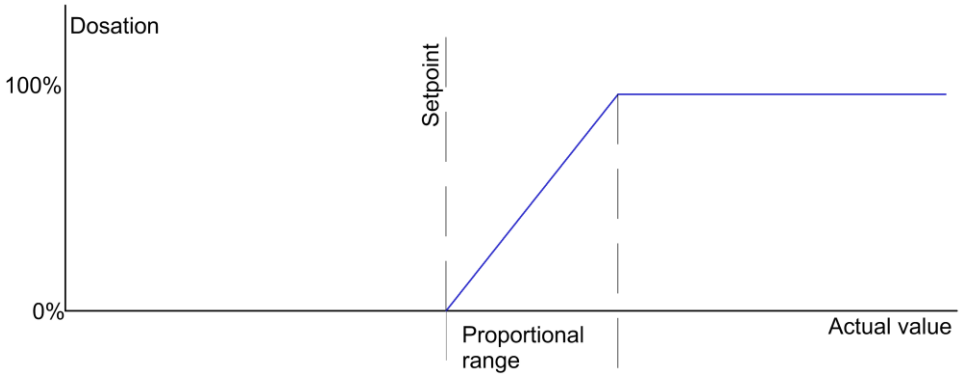


Press the OK key to save the settings.

Factory setting: 8,0

Setting the pH proportional range

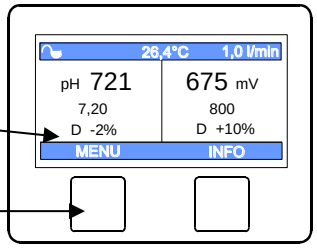
The controller offers the facility for setting the regulation proportional range in order to adapt the WATERFRIEND to the requirements of the specific swimming pool. This value influences the delivery quantity by optimising the pulse-width modulation. This means that the duty cycle is modulated at constant frequency. The numeric value specifies the regulating conductance. At a deviation of the measured actual value from the desired value, which is greater than the P range, the metering pump operates with maximum power. If the actual value approaches the target value inside the proportional range, the metering performance decreases proportionally. This means that the pump is working at reduced power.



Increasing the p-range leads to a slower approach to the target value with less overshoot.

The proportional range may only be adjusted by a specialist.

Metering pump flow rate in %

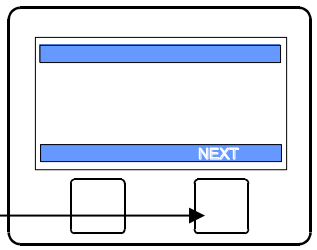


Procedure:

Press the "MENU" key

Move the cursor (blue backed text) to the line "set pH" by pressing the keys △ or ▽.

Press the OK key.

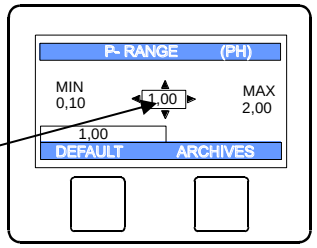


Press the "NEXT" key

Move the cursor (blue backed text) to the line "p-range" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the proportional range. The maximum and minimum possible values are shown right and left in the display.

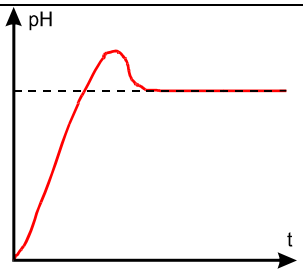
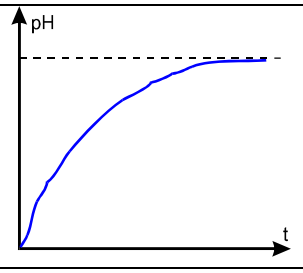


Proportional range

Press the OK key to save the settings.

Factory setting: 1,00

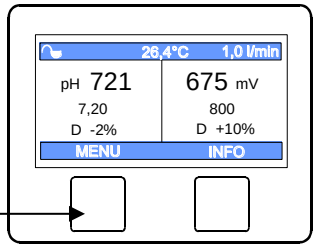
Meaning of the proportional range

Adjustment	Benefits	Disadvantages	Diagram
Small P-range	Fast, accurate control	When switching on an overshoot can occur	
Wide P-range	No overshoot	Slow control, small deviations between desired and actual values possible	

Setting the maximum pH metering time

The metering time limit is a safety function and prevents dangerous overdosing in cases of breakdown. Attention! The higher the maximum dosing time is set, the more acid can be released in an uncontrolled manner in case of any damage of the dosing tube.

The metering time must be adapted to the actual pool size.

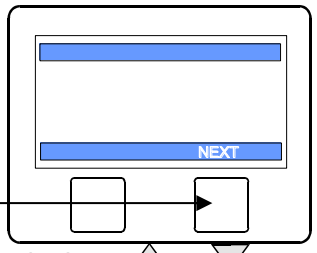


Procedure:

Press the "MENU" key

Move the cursor (blue backed text) to the line "set pH" by pressing the keys △ or ▽.

Press the OK key.

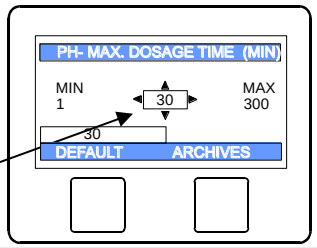


Press the "NEXT" key

Move the cursor (blue backed text) to the line "max. dosage time" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the maximum time. The maximum and minimum possible values are shown right and left in the display.



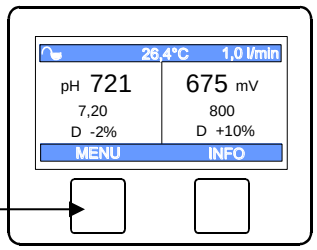
Max. Time

Press the OK key to save the settings.

Factory setting: 60 minutes

pH metering pump flow rate

The integrated speed control for the metering pumps enables optimum adaptation of the regulation to the pool size.

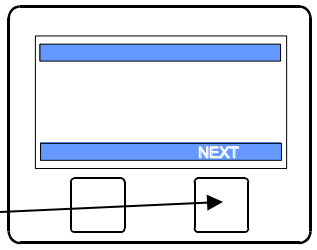


Procedure:

Press the "MENU" key

Move the cursor (blue backed text) to the line "set pH" by pressing the keys △ or ▽.

Press the OK key.

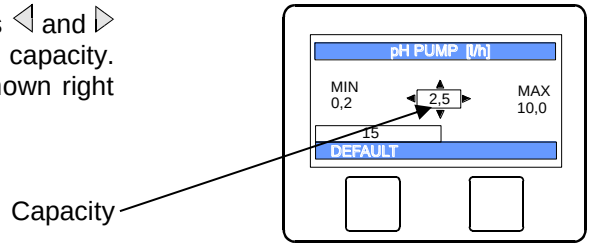


Press the "NEXT" key

Move the cursor (blue backed text) to the line "pH pump [l/h]" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the capacity. The maximum and minimum possible values are shown right and left in the display.



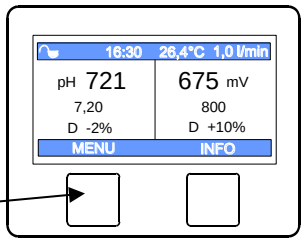
Press the OK key to save the settings.

Factory setting: 1,5 l/h

pH Power-on delay

The controller only starts up after a delay period once the power supply has been provided and once external enable has been switched on (e.g. filter control unit). This power-on delay is necessary because a period specific to the overall system elapses once the filter pumps have been switched on before the completely mixed water reaches the sensors. This mixing process is mainly dependent on the pool size, the dimensions of the filter pump, the pipe length and the filter itself.

The delay period can, if required, be adapted to the actual pool size.

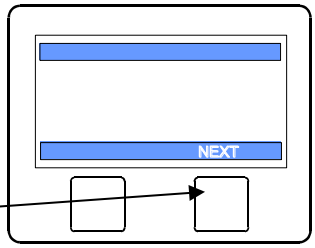


Procedure:

Press the "MENU" key

Move the cursor (blue backed text) to the line "set pH" by pressing the keys △ or ▽.

Press the OK key.

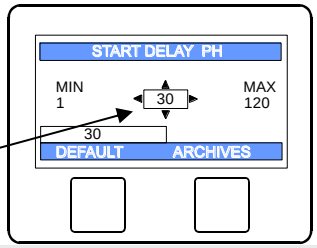


Press the "NEXT" key

Move the cursor (blue backed text) to the line "delay pH" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the delay (in minutes). The maximum and minimum possible values are shown right and left in the display.



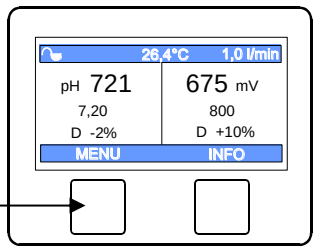
Press the OK key to save the settings.

Factory setting: 30 minutes

ORP regulation

Switching ORP regulation off

In the menu there is a setting to turn on and off the automatic redox regulation.



Procedure:

Press the "MENU" key

Move the cursor (blue backed text) to the line "set ORP" by pressing the keys △ or ▽.

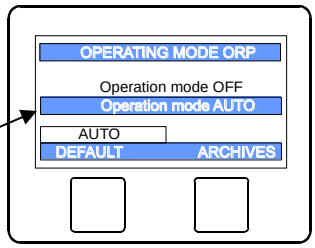
Press the OK key.

Move the cursor (blue backed text) to the line "operating mode" by pressing the keys △ or ▽.

Press the OK key.

By pressing the arrow keys △ and ▽ the cursor can be moved and the desired operating mode can be selected.

Operating mode:
OFF or AUTO



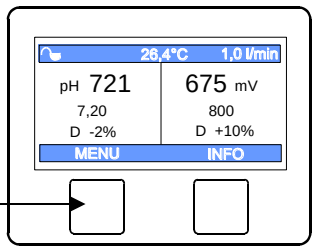
Press the OK key to save the settings.

Setting the ORP target value

There is a setting facility for the required ORP value in the menu.

Procedure:

Press the "MENU" key



Move the cursor (blue backed text) to the line "set ORP" by pressing the keys △ or ▽.

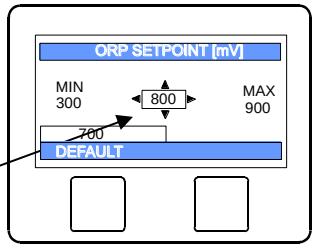
Press the OK key.

Move the cursor (blue backed text) to the line "setpoint" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the target value. The maximum and minimum possible values are shown right and left in the display.

Target value



Setting the alarm limit values

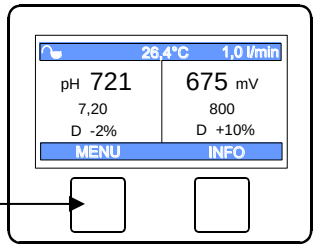
These settings may only be adjusted by a specialist.

Setting the lower ORP alarm

There is a setting facility for the required alarm limit value in the menu.

Procedure:

Press the "MENU" key



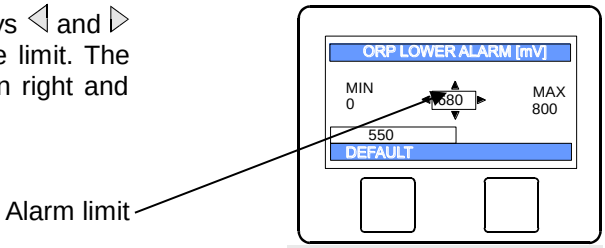
Move the cursor (blue backed text) to the line "set ORP" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "lower alarm" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the limit. The maximum and minimum possible values are shown right and left in the display.

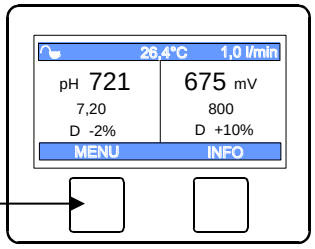


Factory setting: 400mV

Press the OK key to save the settings.

Setting the upper ORP alarm

There is a setting facility for the required alarm limit value in the menu.



Procedure:

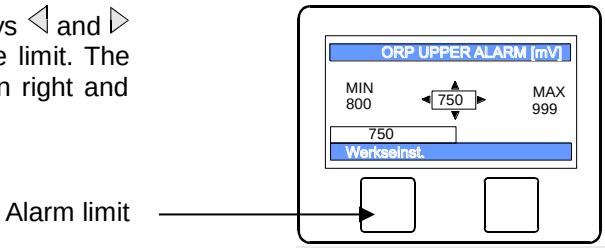
Move the cursor (blue backed text) to the line "set ORP" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "upper alarm" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the limit. The maximum and minimum possible values are shown right and left in the display.

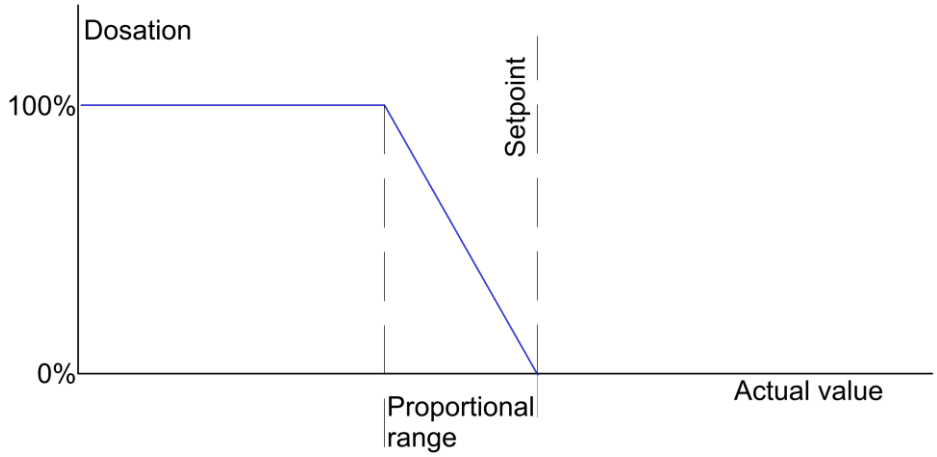


Factory setting: 800mV

Press the OK key to save the settings.

Setting the ORP proportional range

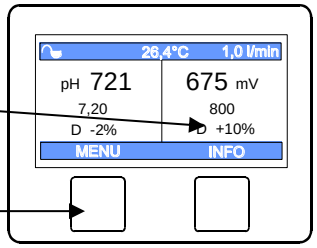
The controller offers the facility for setting the regulation proportional range in order to adapt the WATERFRIEND to the requirements of the specific swimming pool. This value influences the delivery quantity by optimising the pulse-width modulation. This means that the duty cycle is modulated at constant frequency. The numeric value specifies the regulating conductance. At a deviation of the measured actual value from the desired value, which is greater than the P range, the metering pump operates with maximum power. If the actual value approaches the target value inside the proportional range, the metering performance decreases proportionally. This means that the pump is working at reduced power.



Increasing the p-range leads to a slower approach to the target value with less overshoot.

The proportional range may only be adjusted by a specialist.

Metering pump flow rate in %

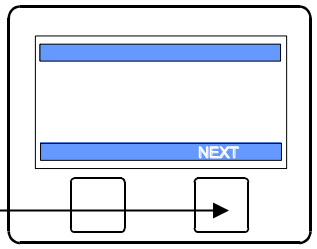


Procedure:

Press the "MENU" key

Move the cursor (blue backed text) to the line "set ORP" by pressing the keys △ or ▽.

Press the OK key.

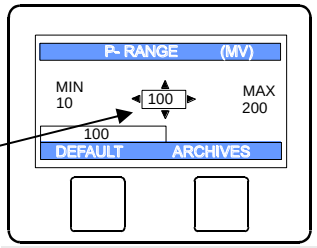


Press the "NEXT" key

Move the cursor (blue backed text) to the line "P-range" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the proportional range. The maximum and minimum possible values are shown right and left in the display.

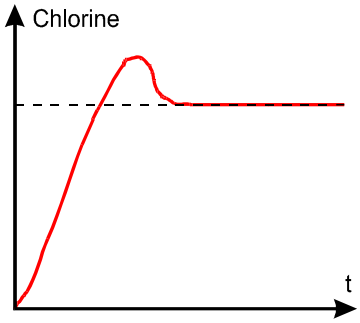
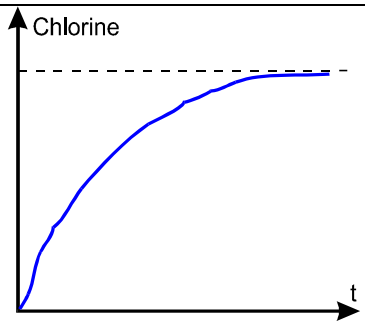


P-range

Press the OK key to save the settings.

Factory setting: 100mV

Meaning of the proportional range

Adjustment	Benefits	Disadvantages	Diagram
Narrow P-range	Fast, accurate control	When switching on, an overshoot can occur	
Wide P-Range	No overshoot	Slow control, small deviations between desired and actual values possible	

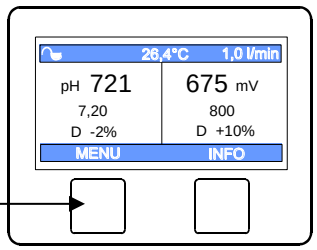
Setting the maximum ORP metering time

The dosing time is a safety feature and prevents dangerous overdosing in case of failure. Attention! The larger the maximum dosing time is set, the more chlorine solution can be released in an uncontrolled manner in case of any damage to the dosing tube!

The metering time must be adapted to the actual pool size.

Procedure:

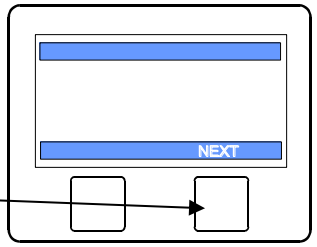
Press the "MENU" key



Move the cursor (blue backed text) to the line "set ORP" by pressing the keys △ or ▽.

Press the OK key.

Press the "NEXT" key

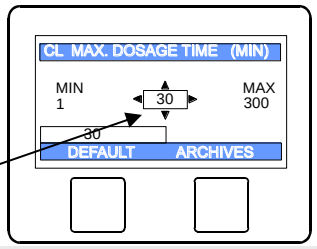


Move the cursor (blue backed text) to the line "max. dosage time" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the time limit. The maximum and minimum possible values are shown right and left in the display.

Max. time



Press the OK key to save the settings.

Factory setting: 60 minutes

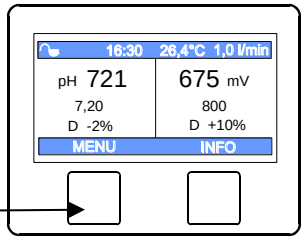
ORP Power-on delay

The controller only starts up after a delay period once the power supply has been provided and once external enable has been switched on (e.g. filter control unit). This power-on delay is necessary because a period specific to the overall system elapses once the filter pumps have been switched on before the completely mixed water reaches the sensors. This mixing process is mainly dependent on the pool size, the dimensions of the filter pump, the pipe length and the filter itself.

The delay period can, if required, be adapted to the actual pool size.

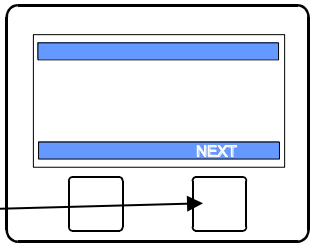
Procedure:

Press the "MENU" key



Move the cursor (blue backed text) to the line "set ORP" by pressing the keys △ or ▽.

Press the OK key.

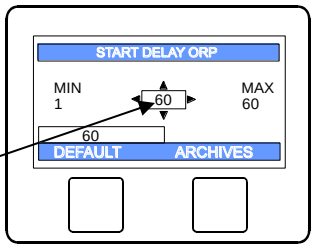


Press the "NEXT" key

Move the cursor (blue backed text) to the line "delay ORP" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the delay (in minutes). The maximum and minimum possible values are shown right and left in the display.



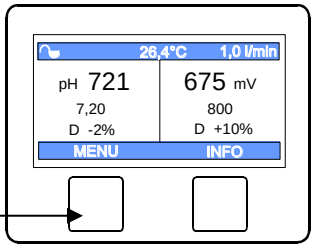
Delay

Press the OK key to save the settings.

Factory setting: 60 minutes

Chlorine metering pump flow rate (ORP)

The integrated speed control for the metering pumps enables optimum adaptation of the regulation to the pool size.

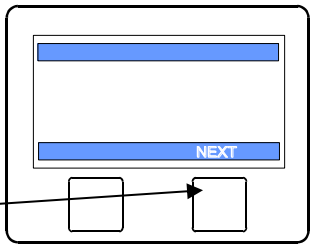


Procedure:

Press the "MENU" key

Move the cursor (blue backed text) to the line "set ORP" by pressing the keys △ or ▽.

Press the OK key.

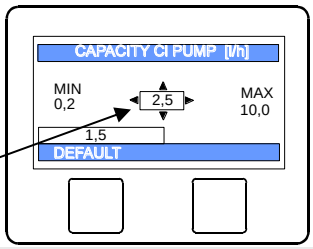


Press the "NEXT" key

Move the cursor (blue backed text) to the line "Cl pump [l/h]" by pressing the keys △ or ▽.

Press the OK key.

You can move the cursor by pressing the arrow keys ◁ and ▷ and also use the △ and ▽ arrow keys to set the capacity. The maximum and minimum possible values are shown right and left in the display.



Capacity

Press the OK key to save the settings.

Factory setting: 1,5 l/h

Calibration

Calibration may only be performed by suitably qualified maintenance personnel. Proper control of the dosing quantities is only possible with correctly calibrated sensors. With incorrectly calibrated sensors, correct dosing of the chemicals cannot be guaranteed and dangerous overdosing can occur!

Once the sensors have been connected, every input must be calibrated during initial start-up. Calibration is necessary even if an electrode is replaced by a new one. The WATERFRIEND checks the calibration procedures for plausibility during the process (slope and offset). Non-calibrated and "badly" calibrated measurement inputs are displayed in plain text.

Time delays occur due to the electrode start-up times when the device is switched on.

Buffer solution

The use-by date must be observed for the buffer solutions The solutions must always be stored in a cool, dark place. Buffer solutions may not be soiled during use. For this reason, electrodes may not be immersed in different buffer solutions successively without cleaning them with distilled water first. It is also important not to rub the electrodes with a cloth, because this causes static charging and incorrect measurements. The necessary buffer solutions for pH 4, pH 7 and for ORP 468mV and spare electrodes are available from the "WATERFRIEND“ metering unit supplier.

Electrodes

The electrodes must be free of impurities, oils and fats etc before they are inserted in the flow fittings. Furthermore, the diaphragms (small spots at the probe point) must be free of coatings, soiling and crystallisation deposits. Do not touch the glass body with your hands to avoid impurities.

Calibrating the pH electrode

The pH electrode can generally be calibrated as a 1-point calibration. This can be done using the pH 7 buffer solution, or, on the fly; be done with the help of a photometer.

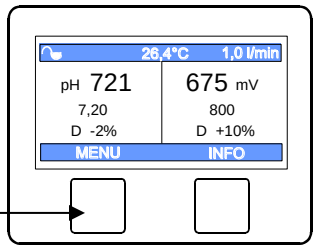
If the measured values deviate significantly, a 2-point calibration with 2 buffer solutions can also be carried out.

The buffer solutions used must be free of impurities and fresh.

Calibrate current working point or upper value (pH 7).

Procedure:

Press the "MENU" key



Move the cursor (blue backed text) to the line "set pH" by pressing the keys ▲ or ▼.

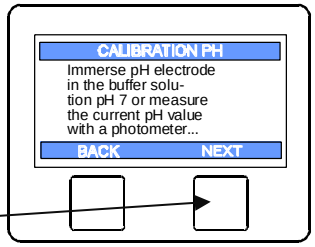
Press the OK key.

Move the cursor (blue backed text) to the line "calibration" by pressing the keys ▲ or ▼.

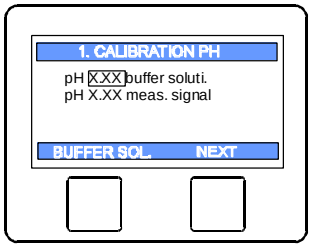
Press the OK key.

If the calibration is to be carried out using a photometer during operation as a one-point calibration, the actual pH value of the pool water should now be determined using a photometer. If the calibration is to be carried out using buffer solutions, the pH electrode must be unscrewed from the flow fitting and then immersed in the green "pH 7" buffer solution.

Press the „NEXT“ key.



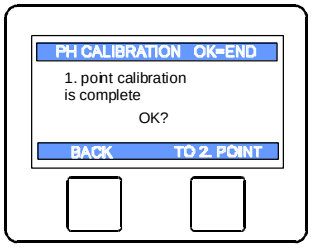
If a calibration is carried out at a pH value that deviates from pH 7, this value must first be entered after pressing the "BUFFER SOL." button.



The display shows the current values of the pH electrode (based on the last calibration). Only when the value shown on the display no longer changes (this takes several minutes), the reference value may be saved with the "OK" or "Next" button.

If a one-point calibration should be carried out, this can now be completed by pressing the OK key.

If a two-point calibration is desired, the second measuring point can be calibrated by pressing the "TO 2. POINT" button.

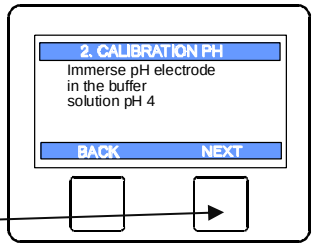


Setting the lower value (pH 4)

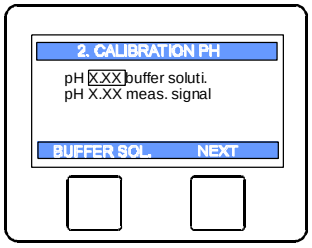
In the second step, the lower point (pH 4) is calibrated. To do this, the pH electrode, previously cleaned with distilled water, is immersed in the pH 4 buffer solution.

Caution: It is also important not to rub the electrode with a cloth, because this causes static charging and incorrect measurements.

Press the „NEXT“ key.

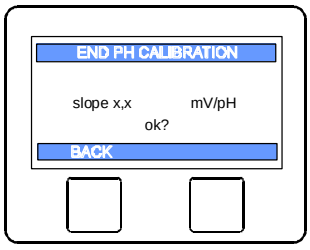


If a calibration is carried out with a buffer solution that deviates from pH 4, this value must first be entered after pressing the "BUFFER SOL." button.



The display shows the current values of the pH electrode (based on the last calibration). Only when the value shown on the display no longer changes (this takes several minutes), the reference value may be saved with the "OK" or "Next" button.

After the calibration, the slope of the electrode is shown on the display. The slope must be in a range between 45.0 to 65.0 mV. Otherwise the message "Big deviation" appears in the display.



Press the OK button to save the setting

pH calibration errors

If the calibration was not able to be completed and the "Big divergence" is shown in the display, the following causes are possible:

- The pH electrode (combination electrode) is worn. The electrode service life is limited depending on the water quality and its care.
- You have mixed up the buffer solution sequence (1st pH 7, 2nd pH 4). This sequence must be strictly observed.
- You used the same buffer solution twice. Correct calibration can only be carried out with two different buffer solutions.
- The buffer solutions are used up or contaminated. In this case, use new buffer solutions.
- The electrode was connected to the wrong transmitter. The pH electrode must be connected to the black transmitter.
- The electrical connection between electrode and transmitter, or that between transmitter and controller, is damaged.

Calibrating the ORP electrode

The ORP potential is measured using the ORP electrode. This electrode measures the voltage which is present in the water due to oxidising and reducing ions.

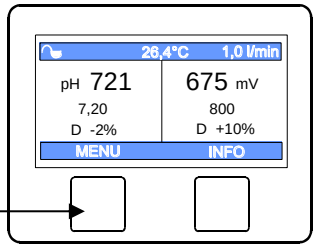
The calibration is carried out as a 1-point calibration with a 468mV buffer solution. This buffer solution must be free of impurities and fresh.

During the calibration, the measured electrode voltage value and the ORP value of the buffer solution are shown in the display. You can use these displayed values to ascertain the quality of the electrode during the calibration.

Calibrating

Procedure:

Press the "MENU" key



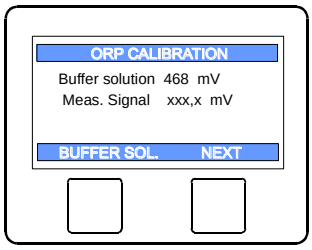
Move the cursor (blue backed text) to the line "set ORP" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "calibration" by pressing the keys △ or ▽.

Press the OK key.

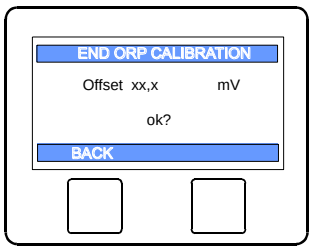
The ORP electrode is immersed in the 468mV buffer solution. The current value for the ORP electrode is then shown in the display. **The discrepancy between the displayed value and the buffer solution value (468mV) should not exceed ± 10 %. If there is a large discrepancy or extended reaction time, the electrode should be replaced as soon as possible.**



If the value shown in the display no longer changes, you should save the reference value by pressing the "OK" key or the "Next" key.

The display now shows the adjacent screen:

Once calibration is complete, the offset of the electrode is shown in the display.



Press the OK key to finish calibration.

ORP calibration errors

If the calibration was not able to be completed or the discrepancy is larger than 10%, the following causes are possible:

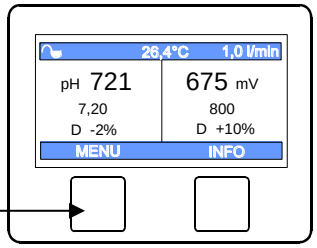
- The ORP electrode (combination electrode) is worn. The electrode service life is limited depending on the water quality and its care.
- You used the wrong buffer solution. It is imperative that 468mV is used. Calibration is not possible if other buffer solutions are used.
- The buffer solution is used up or contaminated. In this case, use a new buffer solution.
- The electrode was connected to the wrong transmitter. The pH electrode must be connected to the white transmitter.
- The electrical connection between electrode and transmitter, or that between transmitter and controller, is damaged.

Service settings

Time and date

Procedure:

Press the "MENU" key



Move the cursor (blue backed text) to the line "SERVICE" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "time & date" by pressing the keys △ or ▽.

Press the OK key.

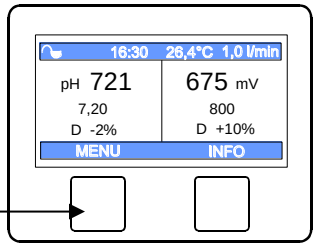
You can now move the cursor by pressing the arrow keys ◁ and ▷, and you can change the settings by use of the arrow keys △ and ▽.

Press the OK key to save the settings.

Selecting the language

Procedure:

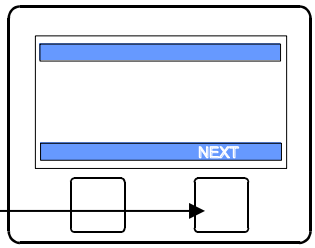
Press the "MENU" key



Move the cursor (blue backed text) to the line "SERVICE" by pressing the keys △ or ▽.

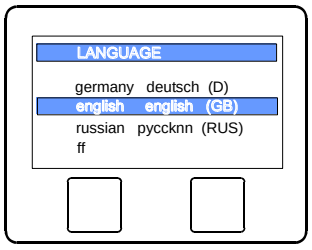
Press the OK key.

Press the "NEXT" key



Move the cursor (blue backed text) to the line "language" by pressing the keys △ or ▽.

Press the OK key.



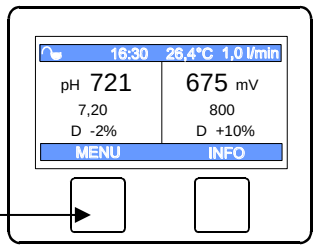
By pressing the arrow keys △ and ▽, the cursor can be moved to select the language.

Press the OK key to save the settings.

Operating hours after the last calibration

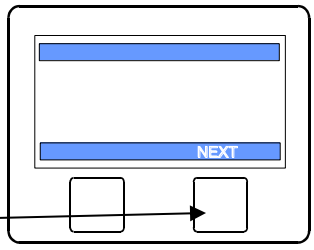
Procedure:

Press the "MENU" key



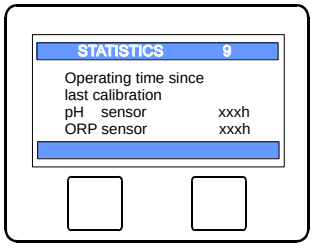
Move the cursor (blue backed text) to the line "SERVICE" by pressing the keys △ or ▽.
Press the OK key.

Press the "NEXT" key



Move the cursor (blue backed text) to the line "Operating hours" by pressing the keys △ or ▽.
Press the OK key.

In the display you see the operating time since the last calibration.

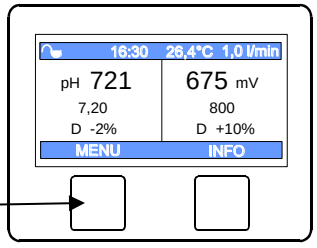


LAN settings

Access control (PIN numbers)

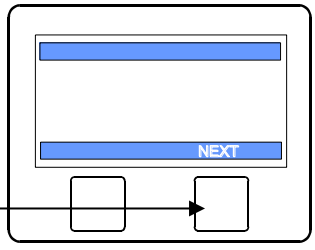
Procedure:

Press the "MENU" key

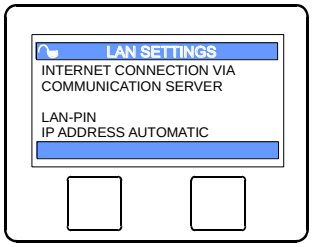


Move the cursor (blue backed text) to the line "SERVICE" by pressing the keys △ or ▽.
Press the OK key.

Press the "NEXT" key



Move the cursor (blue backed text) to the line "LAN settings" by pressing the keys △ or ▽.
Press the OK key.



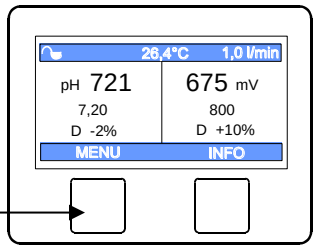
Now the cursor can be moved by pressing the arrow keys △ and ▽, and the desired settings can be made.

LAN-PIN is the password for the low-level area, which enables some parameters to be adjusted. The most important settings are blocked for users with this password.

PRO is the password for the high-level area. This password enables all parameters to be adjusted.

Reset all settings to factory settings

You can use this function to reset all parameters to the factory settings (condition as delivered).



Procedure:

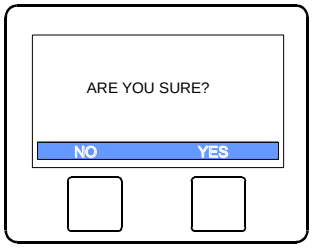
Press the "MENU" key

Move the cursor (blue backed text) to the line "SERVICE" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "factory settings" by pressing the keys △ or ▽.

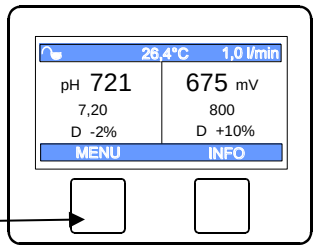
Press the OK key.



If you want to reset all the settings to the factory settings, then press the "YES" key.

Adjustment of temperature display

If the display screen shows a temperature different to the actual temperature present at the sensor in the flow fittings, you can adjust the display. This can be the case, for example, after a temperature sensor has been replaced. The temperature can be changed by up to 10° (+/-).



Procedure:

Press the "MENU" key

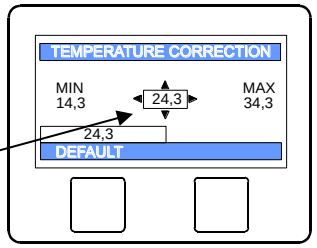
Move the cursor (blue backed text) to the line "SERVICE" by pressing the keys △ or ▽.

Press the OK key.

Move the cursor (blue backed text) to the line "temperature correct." by pressing the keys △ or ▽.

Press the OK key.

By pressing the arrow keys ◁ and ▷, the cursor can be moved and the temperature display can be adjusted by pressing the arrow keys △ and ▽. The maximum and minimum possible values are shown right and left in the display.

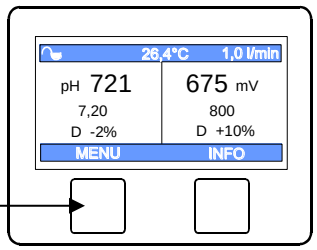


Temperature

Press the OK key to save the settings.

Acoustic error message

The WATERFRIEND has a facility for switching off the acoustic alarm.



Procedure:

Press the "MENU" key

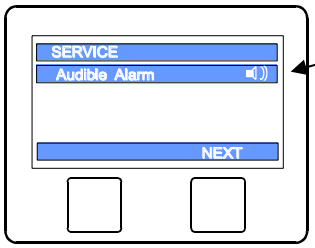
Move the cursor (blue backed text) to the line "SERVICE" by pressing the keys ▲ or ▼.

Press the OK key.

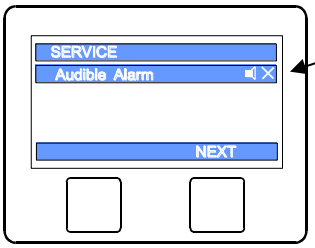
Move the cursor (blue backed text) to the line "Audible Alarm" by pressing the keys ▲ or ▼.

By pressing the OK key, the acoustic alarm can be switched on or off.

Press the "Back" key, which saves the setting.



Alarm ON

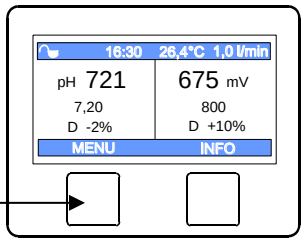


Alarm OFF

Factory setting: ON

Increase pH <=> decrease pH

The controller offers the facility to select between operating modes "increase pH" or "decrease pH" in order to adapt the WATERFRIEND to the requirements of the specific swimming pool.

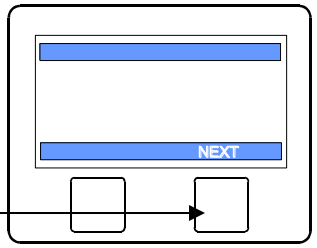


Procedure:

Press the "MENU" key

Move the cursor (blue backed text) to the line "SERVICE" by pressing the keys ▲ or ▼.

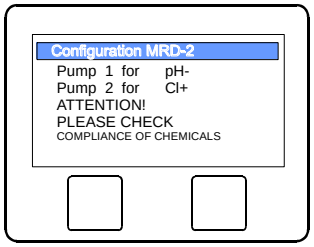
Press the OK key.



Press the "NEXT" key

Move the cursor (blue backed text) to the line "Configuration MRD-2" by pressing the keys ▲ or ▼.

Press the OK key.



Press the OK key.

Move the cursor (blue backed text) to the desired operating mode by pressing the keys ▲ or ▼.

Press the OK key to save the settings.

Note: When changing between pH-decreasing chemicals and pH-raising chemicals, the suction lances, the metering hoses, the flow fittings and the injection valves must be rinsed out with water and thoroughly cleaned.

Alarm / error message

There is an error if the red "Alarm" indicator lamp blinks. If you press the "Info" key, the error message will be shown on the display in plain text.

Acknowledging an error message

If you press the Ok key, the acoustic alarm will be switched off.

Measuring chamber colors

Behind the pH and redox electrodes are multi-colored RGB light-emitting diodes, which signal different states.

When a new WATERFRIEND is installed and the electrodes have been calibrated, the color light will turn green. As the operating time progresses, the color changes steadily over yellow, orange and red. At the latest when the color light is red, the corresponding sensor must be calibrated.

Meaning of the individual colors

Blue:

The flow rate of the measuring water is too low and the dosage is therefore blocked. The flow rate must be between 0.2 and 2.0 l / min. (Recommended 0.7)

Red:

The electrodes must be calibrated.

Green:

The electrodes are calibrated.

Yellow/orange:

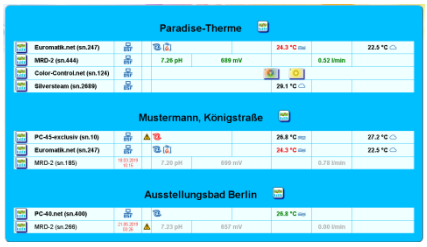
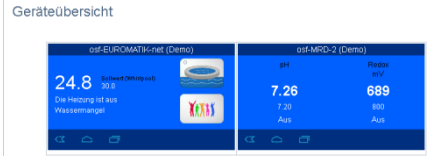
Various operating hours have passed since the last calibration.

Flashing red:

Error message. Please press the info key and read more information in the display.

Using the osf communication server

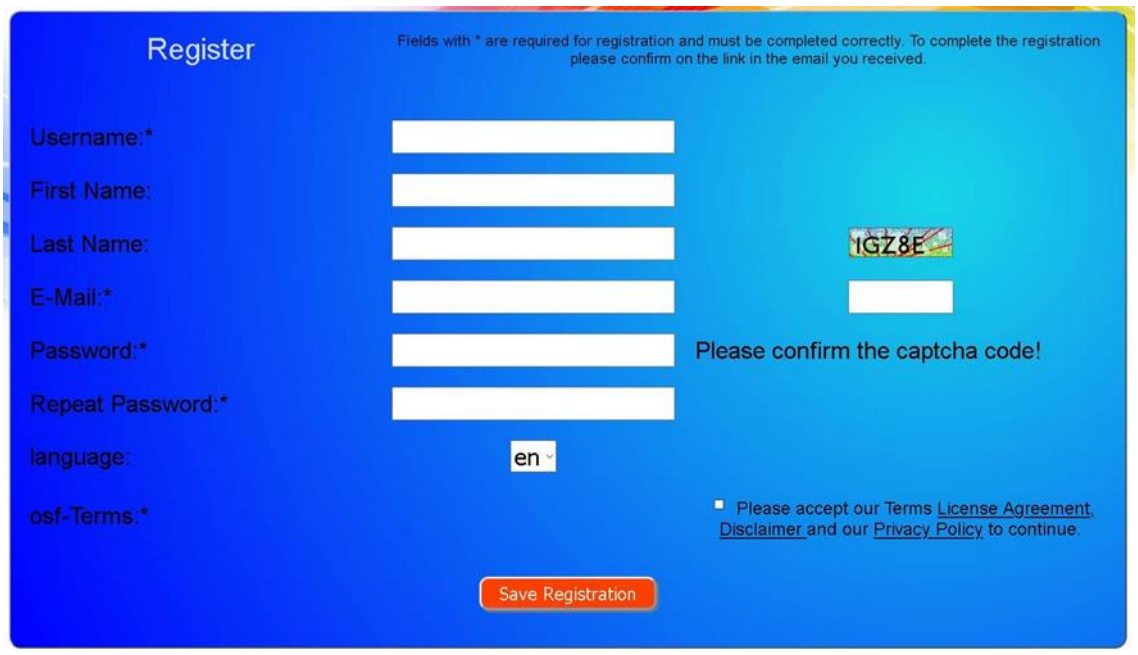
There are four servers available for communication. They each display different information, designed to suit the needs of different user groups.

Mypool.osf.de	This server is designed for **pool owners**. The entire pool system including all web-enabled osf products is displayed on one page on the monitor. The key data for **all** devices can be retrieved with **a single** tap of a button.	
Service.osf.de	This server is designed for **pool installers**. The top-level page shows **all** registered pool installations in a clear layout on the monitor. All main parameters and any fault indicators for every customer system are visible at a glance.	
Devices2.osf.de	This server provides the usual technical view for all connected osf devices.	
Devices.osf.de	For the time being it is still possible to use this familiar server, which has been available for many years. For new installations, however, we recommend the “mypool.osf.de” and “service.osf.de” servers, and “devices2.osf.de”	

Communication server for pool owners

You can access this osf communication server at the address mypool.osf.de

You must first register as a new user:



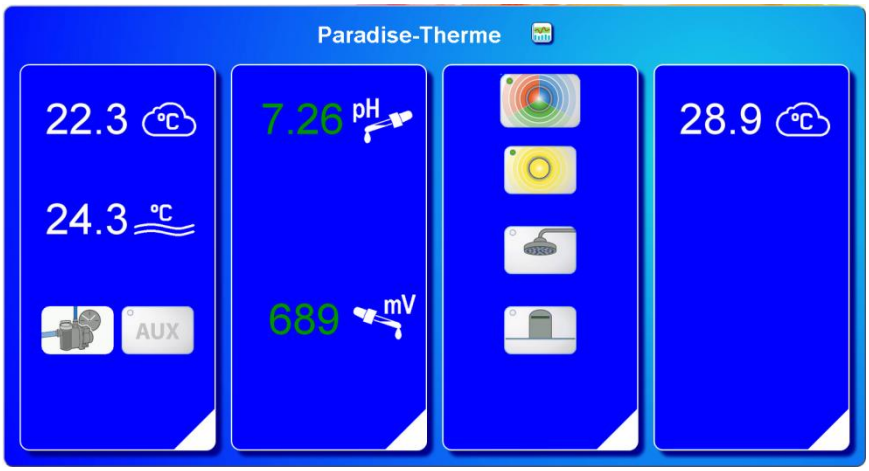
Within a few minutes you should automatically receive an e-mail for confirming your identity. (Check your Spam folder if the e-mail does not arrive). Click the activation link in the e-mail to activate your account.

Registering a new device with the server

Once you have personally registered, you can log in and then register your new device in your user profile.

Each web-enabled osf control unit has a DEVICE ID (identification number). This DEVICE ID must be entered in the correct column in order to register the device with the communication server. You can find the DEVICE ID of your device displayed on its Information page (see above). For devices without a display, the ID number appears on an adhesive label. When finished, save the information you have entered.

If you press the “Your devices” button, your device is now displayed in your Device panel and can be operated via the communication server:

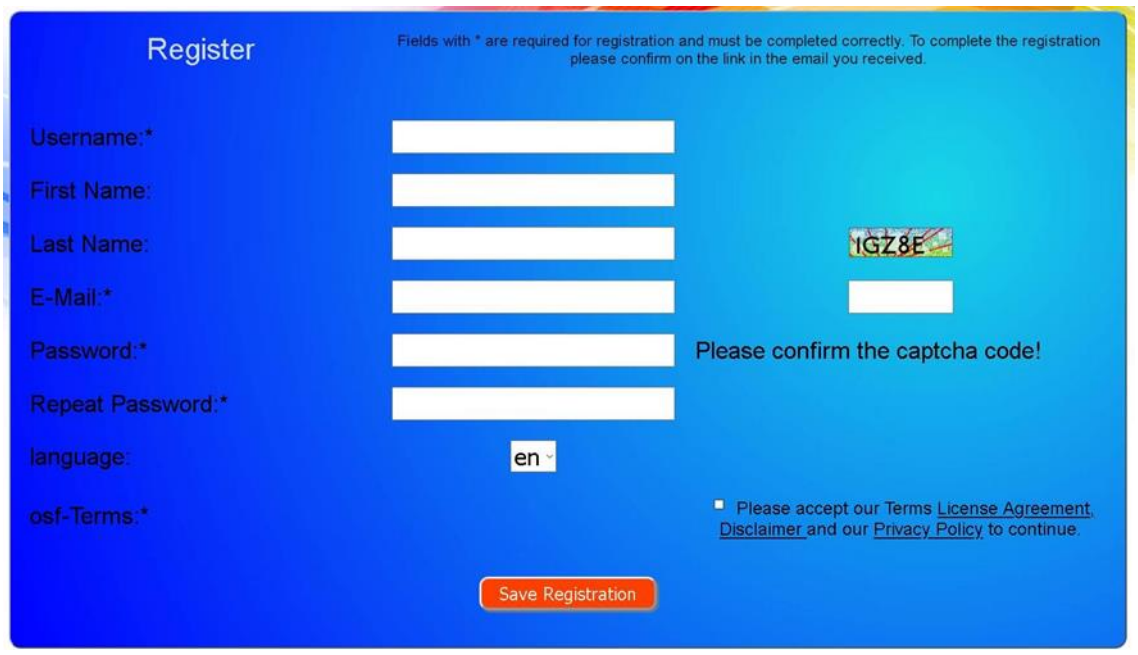


In order to use the communication server, the option "Internet connection via communication server" must be enabled in the control unit itself (default factory setting):

Communication server for pool installers

You can access this osf communication server at the address service.osf.de

You must first register as a new user:



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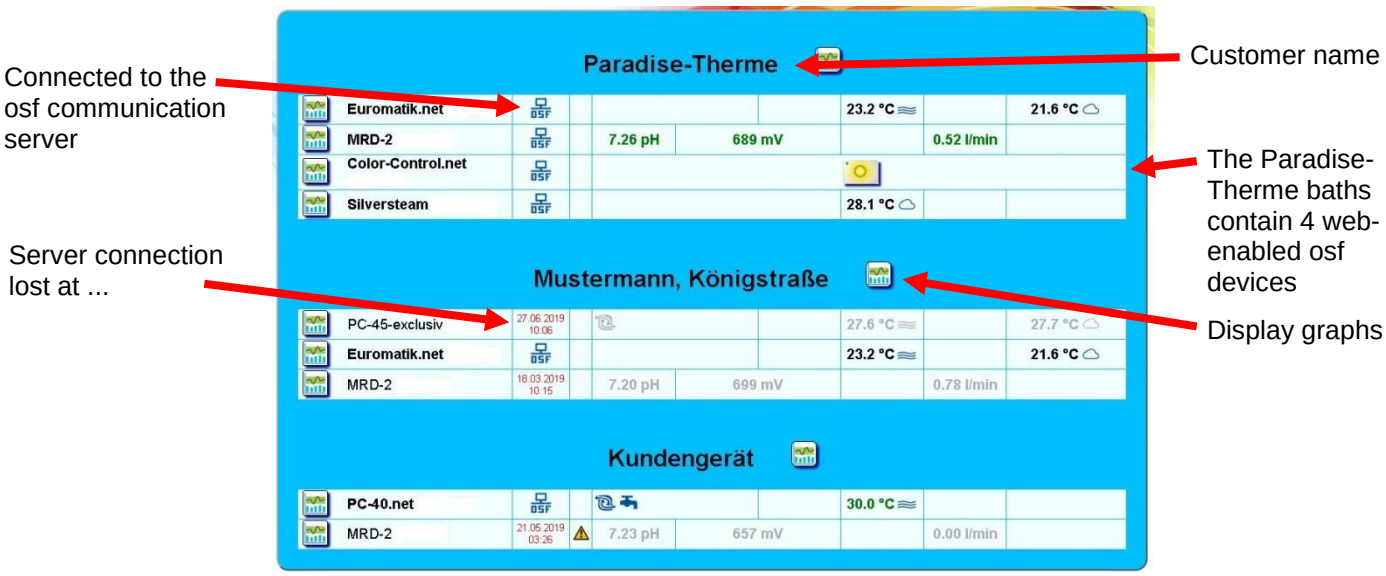
If you press the “Your devices” button, your pool installations are now displayed in your Device panel. This lists the pool installations for all your customers in a table. You can see all the main information at a glance. Fault indicators are highlighted for each pool individually. To display and operate a specific device via the communication server, simply press the associated button for this device:

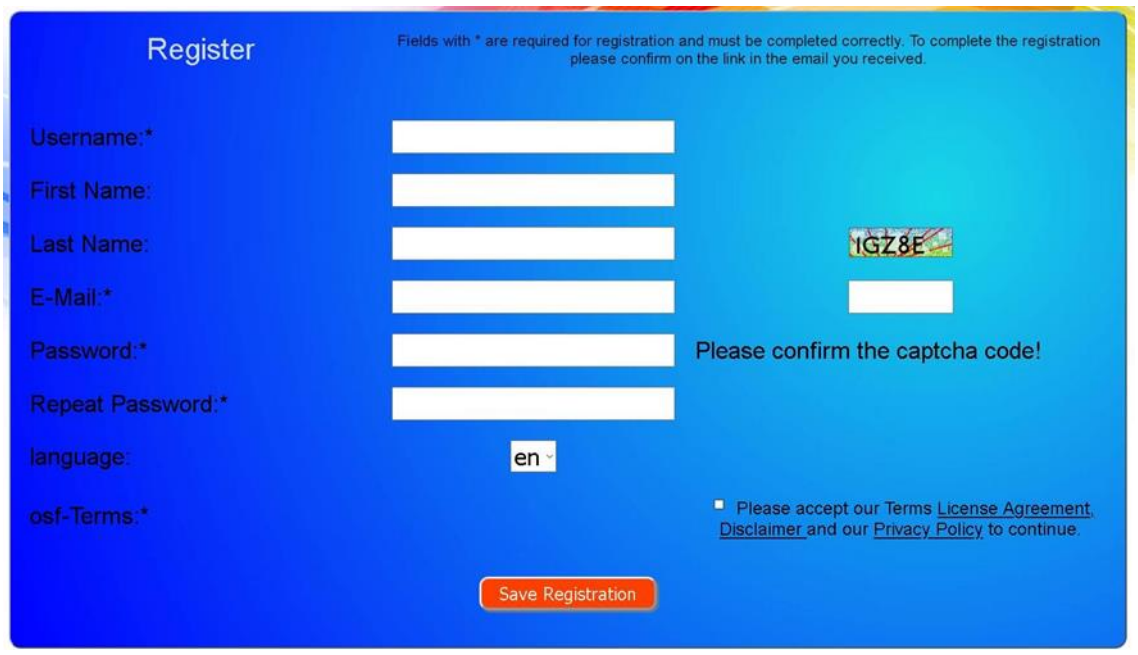


In order to use the communication server, the option "Internet connection via communication server" must be enabled in the control unit itself (default factory setting):

Communication server with technical view

You can access this osf communication server at the address devices2.osf.de

You must first register as a new user:



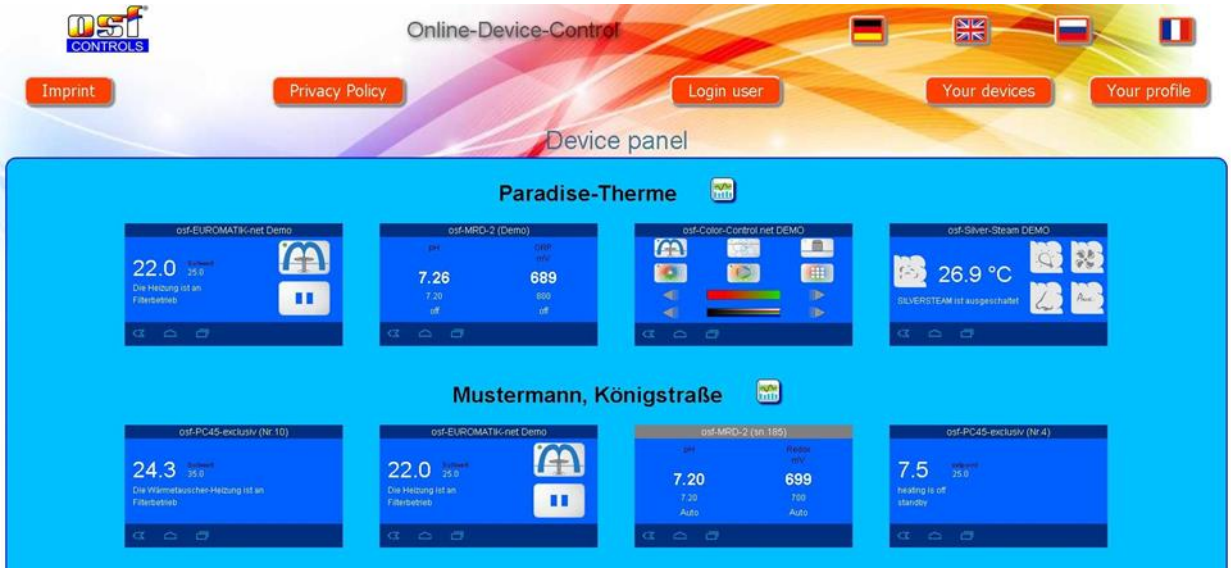
Within a few minutes you should automatically receive an e-mail for confirming your identity. (Check your Spam folder if the e-mail does not arrive). Click the activation link in the e-mail to activate your account.

Registering a new device with the server

Once you have personally registered, you can log in and then register your new device in your user profile.

Each web-enabled osf control unit has a DEVICE ID (identification number). This DEVICE ID must be entered in the correct column in order to register the device with the communication server. You can find the DEVICE ID of your device displayed on its Information page (see above). For devices without a display, the ID number appears on an adhesive label. When finished, save the information you have entered.

Your device is now displayed in your Device panel and can be operated via the communications server:

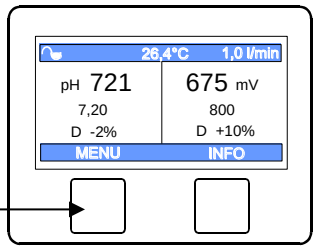


In order to use the communication server, the option "Internet connection via communication server" must be enabled in the control unit itself (default factory setting):

Read device ID on the display of the dosing control

Procedure:

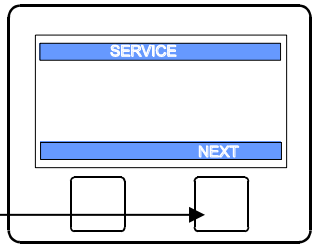
Press the "MENU" button



Move the cursor (blue backed text) to the line "SERVICE" by pressing the keys △ or ▽.

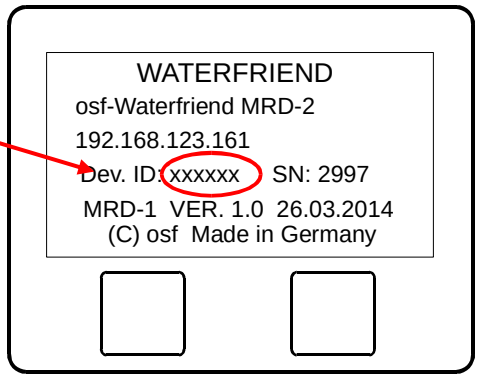
Press the OK key.

Press the "NEXT" button

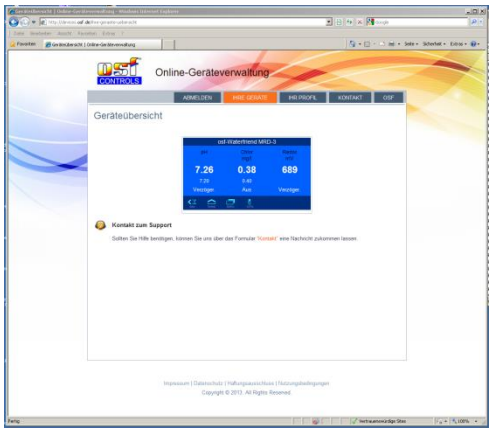


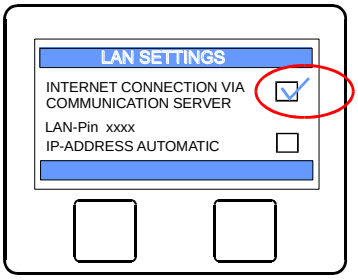
Move the cursor (blue backed text) to the line "About dosage systems" by pressing the keys △ or ▽.

Read the Device ID and enter it in the user profile of the osf communication server.



After that, your device will appear in your device overview and can be operated using the communication server:





For the use of the communication server, the Internet connection via the communication server must be enabled.

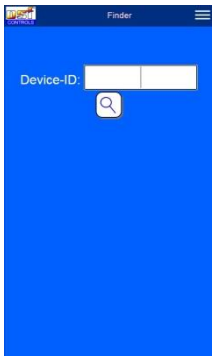
Factory setting: osf Communications Server enabled

Testing the internet connection

The connection of the device to the Internet and to the osf communication servers can be easily checked by calling the osf Device Finder. You can reach the device finder at the following address:

https://osfdevice.de/b/finder/index.php

or by scanning the QR code adjacent:



If you enter the device ID of your device in this input field and then click the magnifying glass button, you will be shown a link and a QR code to connect to your device. You can find the device ID on the system information page (see above). If you then follow the link displayed, you will be taken directly to the home page of your device. For convenient access to your device, this home page can also be saved as a web app on mobile phones.

Changing the PIN (password)

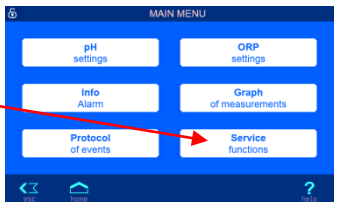
The MRD-2 contains 2-level password protection for access via the LAN. The User PIN lets you operate the control unit and adjust the essential main functions. The Service PIN is needed to perform service functions and to change settings at the Service level. The following PINs are factory-set:

- User PIN: 1234
- Service PIN: 5678

The MRD-2 must be connected to the Internet in order to be able to change the PINs. You make the change to a PIN via the WEB interface of the communication server.

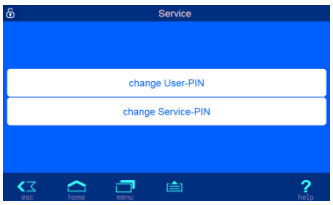
Assigning a new PIN

1. Log in as usual to the communication server
2. Then log in with the Service PIN
3. In the Home page, press the "*menu*" button
4. In the main menu, press the „Service" button



5. Scroll down 3 pages by pressing the  button

6. You can now assign new values to each PIN



Make sure you make a note of the PINs!

Naming the unit

Entering an e-mail address

In order to be able to identify different control units during online access, each osf device has a facility for assigning a name.

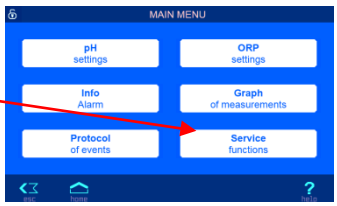
The MRD-2 is able to send any fault indicator messages via e-mail. The control unit must be connected to the Internet for this feature to work. You enter the relevant e-mail addresses (2 maximum) via the WEB interface of the communication server.

Entering an e-mail address

Assigning a name

1. Log in as usual to the communication server
2. Then log in with the Service PIN
3. In the Home page, press the "*menu*" button

4. In the main menu, press the „Service“ button



5. You can enter the name of the unit and the e-mail addresses here

Update

The MRD-2 has a software update facility. The MRD-2 must be connected to the Internet for updating to work. You can perform the update via the WEB interface of the communication server.

Checking for updates

You can use this function to check whether an update is available for your device.

1. Log in as usual to the communication server
2. Then log in with the Service PIN
3. On the Home page. press the „esc“ button

4. On the Info page, press the “*Check for Update*” button

5. You can now start the download and install the update

Explanations

Storage, Transport

During transport and storage it is important to note that the single-rod measuring chains are frost resistant down to minus 10 ° C. For lower temperatures, we have special single-rod measuring chains in the delivery program.

Maintenance

Service work may only carried out on de-pressurised, voltage-free equipment which has been protected against unauthorised switching on.

The metering unit should be serviced by specialist personnel at regular intervals.

6-monthly service

Sealtightness

Check all connections for sealtightness at regular intervals.

Dirt filter

The filter screen should be checked for soiling and accumulations at regular intervals. The filter screen must be cleaned or replaced if necessary.

Injection valves

The injection valves should be checked for soiling and accumulations at regular intervals. They should be cleaned if necessary.

pH electrode

The electrode function is checked at regular intervals using the two buffer solutions (pH7 and pH4). If there are any noticeable variations, the electrode should be calibrated or replaced (see above in manual, "Calibrating pH electrode").

ORP electrode

The electrode function is checked at regular intervals using buffer solution 468mV. If there are any noticeable variations, the electrode should be calibrated or replaced (see above in manual, "Calibrating ORP electrode").

Metering pumps

Protect yourself against the metering media, wear appropriate protective clothing.

Once the pump has cooled down, check the hose for any possible damage. The pump hose must be circular and may not show any signs of leakage or damage. Any damaged hoses must be replaced.

Annual service

Replacing ORP and pH electrodes

The electrodes should be replaced at intervals of one year (see above in manual, "Calibrating electrodes").

Replacing the metering hose

Protect yourself against the metering media, wear appropriate protective clothing.

The metering hoses should be replaced at intervals of one year.

Decommissioning

If the metering unit will not be used for long periods, for example during the winter, the following measures are necessary.

Electrodes

Take the electrodes out of the flow fitting and insert them in the case in which they were delivered.

Flow fitting

Empty the flow fitting.

Metering pumps

Rinse out the metering hoses thoroughly with hot water. Empty the metering hoses and remove them from the metering pumps.

Wear parts

The following components are wear parts for which no guarantee can be provided:

- electrodes (combination electrodes)
- metering pump hoses
- buffer solutions

Interfacing with building automation systems

The MRD-2 contains an HTTP web server, which is designed to allow the control unit to be operated using any web browser from any web-enabled terminal.

The HTML pages generated by this web server can also be accessed by a building automation system and can be interpreted for display on EIB visualization devices. For the purpose of controlling the MRD-2, the building automation system can generate IP messages, in the same way as they would be generated by a web browser when you click on controls on the HTML pages. In other words, the building automation system must emulate a web browser.

Instead of using directly the predefined HTML pages designed by for displaying on web browsers, you (as user) can also design your own control file to obtain the data you require in "custom" form, and save this file on the SD card in the MRD-2. This means that the interface to the building automation system is then unaffected by potential design changes to the HTML pages.

This control file must be saved as an ASCII text file with the extension ".HTM" in the "HTML" folder on the SD card. The file name must not exceed 8 characters in length. Although it has the "HTM" extension, this file need not necessarily be a valid HTML file, but can be formatted to suit the requirements of the building automation system.

This control file can contain variables in the format "$$nnnn", which the web server then replaces with the data that is currently valid. A list of available variables appears at the end of this document.

A control file "ISTWERTE.HTM" containing the following:

```
pH value: $$0001 pH
ORP value: $$0003  mV
```

would, on opening “http://xxx.xxx.xxx.xxx/istwerte.htm", return the following text for example:

```
pH value: 7.26 pH
ORP value: 689  mV
```

These control files can also be used selectively to read specific datapoints, e.g. "REDOX.HTM" containing the following:

```
$$0003
```

returns

```
689
```

In order to make changes to data in the control unit from the building automation system, the building automation system must emulate sending an HTML form. This is done by a URL invocation in the form "http://xxx.xxx.xxx.xxx/modify?nnnn=data", where nnnn is the number of the variable to be changed, and data represents the data to be stored.

Before the building automation system can change any variables, it must first log in by sending a valid PIN number to the variable 0003:

„http://xxx.xxx.xxx.xxx/modify?0000=dddd“, where dddd is the user PIN configured in the unit.

Variables can be set after successful login, e.g. set the ORP value to 650 mV:

„http://xxx.xxx.xxx.xxx/modify? 0013=650“.

Afterwards, the building automation system should log out by writing to the variable 0003 again with any invalid value:

„http://xxx.xxx.xxx.xxx/modify?0000=0000“

A similar call sequence can be used, for example, to switch the operating mode of the redox control:

„http://xxx.xxx.xxx.xxx/modify?0000=dddd“	Login
„http://xxx.xxx.xxx.xxx/modify?0032=i“	Switch operating mode
„http://xxx.xxx.xxx.xxx/modify?0000=0000“	Logout

Variables available for communication with the building management system:

Number	Description	Read/ Write	Data format	Range	Info
0000	LAN-PIN	W	„####“	„0000“ - „9999“	Login
0001	Actual value pH	R	„#.##“		pH
0003	Actual value ORP	R	„###“		mV
0004	Actual value temperature	R	„##.#“		°C
0005	Actual value water flow	R	„#.##“		l/min
0011	Setpoint pH	R/W	„#.##“	„6.00“ - „8.00“	pH
0013	Setpoint ORP	R/W	„###“	„400“ - „800“	mV
0021	Status message pH controller	R	Text		
0023	Status message ORP controller	R	Text		
0026	Current dosing rate pH	R	„##.##“		l/h
0027	Current dosing rate chlorine	R	„##.##“		l/h
0031	Operating mode pH controller	W	ASCII	'0', '1', 'i'	0: Auto mode on 1: Auto mode off i: Switch modes
0032	Operating mode ORP controller	W	ASCII	'0', '1', 'i'	0: Auto mode on 1: Auto mode off i: Switch modes
0041	Lower alarm limit value pH	R/W	„#.##“	„3.00“ - „8.00“	pH
0043	Lower alarm limit value ORP	R/W	„###“	„300“ - „700“	mV
0051	Upper alarm limit value pH	R/W	„#.##“	„6.00“ - „9.99“	pH
0053	Upper alarm limit value ORP	R/W	„###“	„700“ - „999“	mV
9000	Collective fault message	R	'#'	'0' - '1'	'0'=Off, '1'=On
9031	Status variable pH control	R	'#'	'0' - '1'	'0'=Off, '1'=Automatic
9032	Status variable ORP control	R	'#'	'0' - '1'	'0'=Off, '1'=Automatic

We hope you have a lot of enjoyment and relaxation in your swimming pool

Further information can be found on the Internet at the following address:
https://osf.de/download/documents/documents.php?device=MRD-2

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Detach this page and use it for the return shipment!

Shipment of the dosing system

WATERFRIEND

Declaration of non-objection

If you have to return a **WATER**FRIEND, you must send this form, filled out, back with every return device.

Type: .....

Serial number: .....

We hereby guarantee that we have professionally cleaned the device before shipping. It is free of corrosive substances and other chemical substances which could cause a health hazard. This means that there are no hazards caused by residual contamination. This form has been correctly and completely filled out and the device has been shipped in accordance with the statutory requirements.

If the manufacturer has to carry out cleaning work, all costs incurred will be invoiced.

Please fill out legibly:

Company: .....

Road: ..... Postcode, town .....

Country: ..... Telephone: .....

E-mail: ..... Fax:.....

Surname: ..... First name:.....

Date: .....

Signature: ..... Stamp:

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